

# Draft Aquatic Life Ambient Water Quality Criterion for Selenium (Freshwater) 2015

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UTAH WATER QUALITY STANDARDS WORKGROUP 12/14/15

PRESENTED BY: LAREINA GUENZEL, REGION 8 WQU

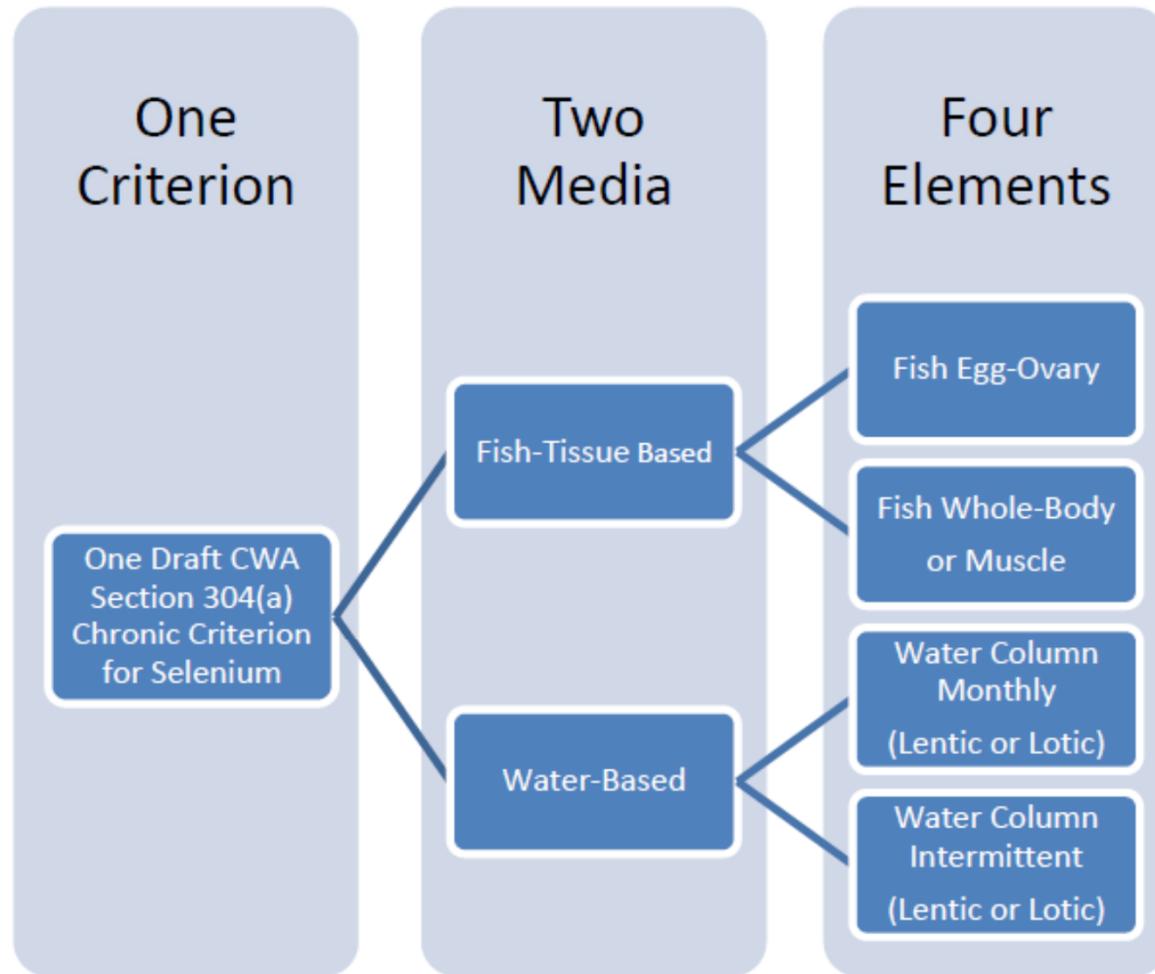
# Public Comment and Peer Review

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- Draft criteria document published in 2004
- External peer review draft published May 14, 2014
- Draft criteria document published July, 27, 2015
  - Public comment period closed October 30, 2015
- Draft criteria document and responses to peer review and public comments are available at:

<http://water.epa.gov/scitech/swguidance/standards/criteria/aqlife/selenium/index.cfm>

**Figure 1**



# Draft criteria values vs. external peer review values

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Version	Egg-Ovary mg/kg dw	Whole Body mg/kg dw	Muscle mg/kg dw	Water – Lentic ug/L	Water – Lotic ug/L
External Peer Review Draft (2014)	15.3	8.1	11.8	1.3	4.8
Draft Criteria (2015)	15.8	8.0	11.3	1.2	3.1

# What changed the numbers?

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## Reanalysis of the Simplot brown trout study

- Brown trout is no longer the most sensitive species

## Reanalysis of bluegill study (Hermanutz 1992-1996)

## New data for white sturgeon

- Most sensitive species in species-sensitivity distribution (SSD)

## Revised trophic transfer factors (TTFs) and enrichment factors (EF)

- More protective water column values

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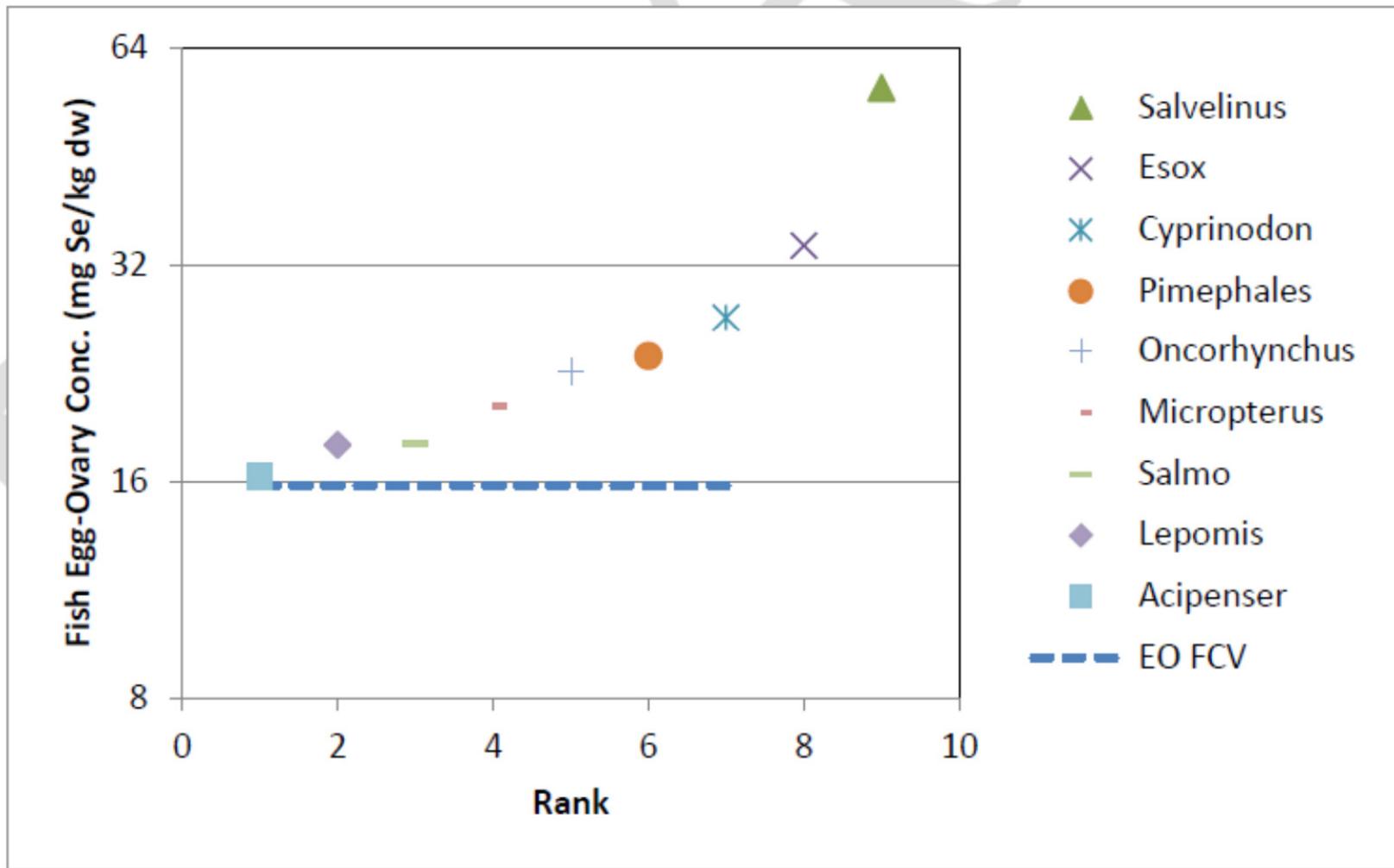
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**Figure 3.1. Distribution of reproductive-effect GMCVs for fish measured as egg-ovary concentrations.**

**Table 3.2. Ranked Genus Mean Chronic Values for Fish Reproductive Effects Measured as Egg or Ovary Concentrations.**

Rank	GMCV* (mg Se/kg dw EO)	Species	SMCV (mg Se/kg dw EO)
9	56.22	Dolly Varden, <i>Salvelinus malma</i>	56.22
8	< 34	Northern pike, <i>Esox lucius</i>	< 34
7	27	Desert pupfish, <i>Cyprinodon macularius</i>	27
6	< 23.85	Fathead minnow, <i>Pimephales promelas</i>	< 23.85**
5	22.71	Cutthroat trout, <i>Oncorhynchus clarkii</i>	24.45
		Rainbow trout, <i>Oncorhynchus mykiss</i>	21.1
4	20.35	Largemouth bass, <i>Micropterus salmoides</i>	20.35
3	18.09	Brown trout, <i>Salmo trutta</i>	18.09
2	17.95	Bluegill sunfish, <i>Lepomis macrochirus</i>	17.95
1	16.27	White sturgeon, <i>Acipenser transmontanus</i>	16.27

\* This table excludes *Gambusia*, which has a reproductive chronic value expressed as adult whole-body rather than egg-ovary, because it is a live bearer.

\*\* The fathead minnow SMCV is a conservative estimate because it does not include the higher EC<sub>10S</sub> for survival and deformities from GEI (2008), 35 – 65 mg/kg dw expressed as maternal whole body, as noted in Appendix E, Figures E-1 and E-2.

# Criteria Table Footnotes

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1 Overrides any whole-body, muscle, or water column elements when fish egg/ovary concentrations are measured, except in certain situations. See footnote 3.

2 Overrides any water column element when both fish tissue and water concentrations are measured, except in certain situations. See footnote 3.

3 Water column values are based on dissolved total selenium (includes all oxidation states, i.e., selenite, selenate, organic selenium and any other forms) in water. Water column values have primacy over fish tissue values under two circumstances: 1) “Fishless waters” (waters where fish have been extirpated or where physical habitat and/or flow regime cannot sustain fish populations); and 2) New (see glossary) or increased inputs of selenium from a specific source until equilibrium is reached.

4 Where WQC30-day is the water column monthly element, for either a lentic or lotic system, as appropriate.  $C_{\text{bkgrnd}}$  is the average background selenium concentration, and  $f_{\text{int}}$  is the fraction of any 30-day period during which elevated selenium concentrations occurs, with  $f_{\text{int}}$  assigned a value  $\geq 0.033$  (corresponding to 1 day). See Section 3.3.

5 Instantaneous measurement. Fish tissue data provide point measurements that reflect integrative accumulation of selenium over time and space in the fish at a given site. Selenium concentrations in fish tissue are expected to change only gradually over time in response to environmental fluctuations.

# Questions?

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Lareina Guenzel

Region 8 EPA

[guenzel.lareina@epa.gov](mailto:guenzel.lareina@epa.gov)

303-312-6610